Ketamine for Bone Marrow Aspiration and Trephine Biopsy in Children

Pages with reference to book, From 304 To 305

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Abstract

To make bone marrow aspiration and trephine biopsy less painful and more acceptable in children a short acting anaesthetic ketamine was used in a dose of 1-2 mg/kg body weight intravenously or 4-5 mg/kg intramuscularly. One hundred cases aged 2 to 13 years were studied. The actual procedure time ranged between 20 seconds and 3 minutes, adequate samples were obtained in 80% of children on first attempt. Vomitingwas the only side effectnoted in twochildren. Ketamine issafeand recommended in all children undergoing bone marrow aspiration and trephine biopsies (JPMA 47:304, 1997).

Introduction

Bone marrow aspiration and trephine biopsy isa routine procedure for the diagnosis of haematological disorders. Although painful, it is still acceptable in adults under local anaesthetic, while in children it requires a general anesthetic. Ketaniine, a short acting anaesthetic agent is widely used in paediatric practice for brief procedures and is found to be sale and effective[1-5]. It was therefore used for this procedure at Haematology Department of Armed Forces Institute of Pathology in collaboration with department of Anaesthesia, Combined Militaiy Hospital (CM}l), Rawalpindi. The aim was to determine the efficacy and safety of ketamine use in children.

Patients and Methods

One hundred patients of less than 15 years of age who presented for bone marrow aspiration and/or trephine biopsy were included in the study. Patients were kept nil by mouth for 2-4 hours pnorto the procedure. Ketamine was givenina dose of 1-2 mg/kg body weight diluted in 10 mIs of 0.9% sodium chloride or 5% dextrose water intravenously in atleast 60 seconds. Additional ketamine if required was administrated (0.0 1-0.03 mg/kg) by continuous infusion, In patients with poor venous access 4-5 mg/kg ketamine was given intramuscularly Authorized staff, trained and deputed by senioranaesthetists adniinisteredketamine to the patients. Full paediatric resuscitation equipment and drugs were available at all times. During anaesthesia the ventilatory and cardiovascular monitoring was done by observation of lips and nails for cyanosis, respiratory rate, pulse rate and pulse volume and blood pressure measurements. Bone marrow aspiration and/or trephine biopsy was performed and the time-taken for the procedure (putting in the aspiration or trephine needle and getting the sample) was recorded. Number of attempts at getting a sample were also recorded. After the procedure the patients were kept under observation till full recoveiy and observed for respiratory depression or irregular aspiration, vomiting, uncontrolled muscle movements and hallucinations. The attendants were instructed not to talk to or move the patients prior to full recoveiy.

Results

One hundred cases were studied from 4-10-95 to 24-1-96. There were 69 males and 31 females. Age ranged between 5 months and 14 years with majority (9 1%) being 10 years. Procedure time for bone marrow aspiration was between 20-60 seconds with a mean of 30 seconds. For bone marrow trephine biopsy the procedure time ranged between 60-120 seconds with a mean of 92 seconds. Most (80%) of the samples were taken at first attempt and the reason fora second attempt was a diluted sample. The indications for the procedure were thrombocytopenia, pancytopenia, anaemia, acute leukaemia, lymphoma, osteopeirosis and hyperspienism. Vomiting was the only side effect noted in 2 patients.

Discussion

Bone marrow aspiration/trephine biopsy is a painful and temfying procedure for children, their relatives and the doctor and a general anaesthetic is required. The time and effort for the general inhalation anaesthesia makes it impractical for a busy haematology department. Ketamine is a short acting anaesthetic which can be given by intravenous or intramuscularroute[6]. The usual dose is 1-2 mg/kgbody weight intravenously and 4-6 mg/kg intramuscularly. Surgical anaesthesia is established within 30 seconds after IV injection and the anaesthetic effect usually lasts 15 minutes while the intramuscular dose produces surgical anaesthesia within 3-4 minutes following injection and the anaesthetic effect usually lasts for 12-25 minutes[6]. It has been used extensively in children undergoing short diagnostic and therapeutic procedures such as bone marrow aspirations, lumbar puncture, radiologic imaging and radiation therapy[1]. It is also used forbriefpaediatric dental procedures, wound repairs and other emergency minor surgical procedures[2,3,5]. In our experience with ketamine the patients were adequately anaesthetized and the previously noted problems of improper site and inadequate sampling due to uncooperative children were not seen. The only reason fora repeat aspiration was bone marrow samples diluted withperipheral blood. The major side effects of ketamine include hallucinations, blood pressure alterations, increased salivary and tracheobronchial secretions, muscle twitching and vomiting[7]. These side effects are however, much less insignificant in children. Ketaniine has a good safety record in paediatric practice[1,5,6]. The only side effect noted in our experience was vomiting seen in2 children. Ketarnine anaesthesia is therefore, suitable and safe for children having bone marrow aspiration. It is however, emphasized that it should be given by trained staff and with full emergency recussitation equipment at hand.

Acknowledgements

The authors thank Mr. Syed Tufail Flussain Shah and Mr. Allah Nawaz Dar, for typing the manuscript and the trainee and technical staff of AFIP and department of anaesthesia CMH, Rawalpindi for their help during the study.

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